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ABSTRACT

What are behavioral objectives? Why write and use behavioral objectives? Where do behavioral objectives come from? These three questions are answered in some detail in this paper; lists of selected references and resources and an annotated bibliography of "how-to" books accompany the text which summarizes much of the research dealing with behavioral objectives. The author states that behavioral objectives are "the first step in making more effective, systematic, and rational that most precious, most human activity--teaching others." (JY)

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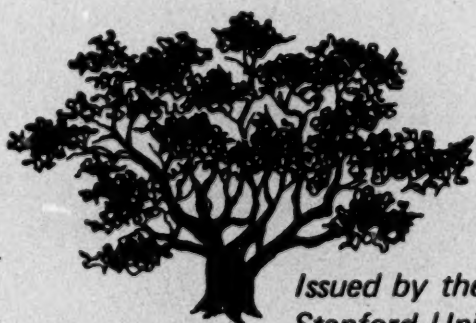
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**BEHAVIORAL OBJECTIVES
A SELECTED BIBLIOGRAPHY & BRIEF REVIEW**

By George L. Geis

Centre for Learning & Development
McGill University
Montreal, Quebec

April 1972



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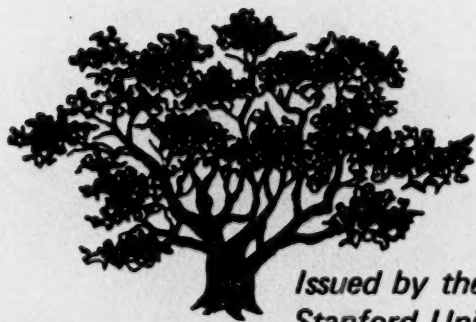
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INTRODUCTION

The purpose of this paper is to identify and organize the major topics in the area of behavioral objectives and to present a sampling of the literature in that area. (Note: where a reference is made to the same source in two different sections, the reference is repeated in each bibliography for convenience's sake.)

No attempt has been made to produce a comprehensive bibliography. This Herculean task fortunately has been carried out by others. The Canadian Teachers' Federation (1971) has recently made available a large and comprehensive bibliography of books, articles and papers totaling more than 350 items. Poulliotte and Peters (1971) have produced an even larger bibliography. It is not annotated but is divided into several sections for easier searching and is an invaluable source to the student in this area.

A number of books contain articles or chapters discussing behavioral objectives. The most comprehensive collection is a recent book by Kapfer (1971) which includes about 40 separate articles on such topics as: "Behavioral objectives and the teaching of values," "Behavioral objectives and the educational technologist," and "Classifying objectives to improve instruction."

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WHAT ARE BEHAVIORAL OBJECTIVES?

Definition

Stating goals and aims for education is not a new activity. Tyler (1949, 1950, 1964) and his associates have been pressing educators to define objectives more precisely for more than three decades. In the last ten years there has been increasing emphasis on stating *behavioral objectives*. Most definitions of behavioral objectives follow Mager's (1962) three criteria.

A behavioral objective states:

- an *action* performed by a student
- the *condition* under which the performance is to occur
- the *criteria* of acceptable performance.

For example:

"Given a human skeleton (*condition*), the student must be able to correctly identify by labeling (*action*) at least 40 of the following bones . . . (*criteria*)"

Along similar lines, Kibler *et al.* (1970) define objectives in terms of 5 components:

- (1) *who* is to perform the desired behavior . . .
- (2) the *actual* behavior to be employed in demonstrating mastery of the objectives . . .
- (3) the *result* (i.e., the product or performance) of the behavior which will be evaluated . . . (e.g., 'an essay' or 'the speech')
- (4) the *relevant conditions* under which the behavior is to be performed . . .
- (5) the *standard* which will be used to evaluate the success of the product or performance."

The particular language used in stating the objective is critical. Most authors pay special attention to the *verb* in the statement of an objective. Such "non-observable" verbs as think, appreciate, enjoy, know are unacceptable while specific, observable action verbs (e.g., writes, assembles, states) are given a stamp of approval. Some authors have even provided illustrative lists of such verbs, for example, Gronlund (1970) and Bloom, *et al.* (1971).

Jenkins and Deno (1968) present a more detailed discussion of the major characteristics of behavioral objectives along with an instructive "critical component analysis instrument."

Dimensions

Behavioral objectives vary along a number of dimensions: 1. kinds, 2. specificity, 3. complexity, 4. time, 5. comprehensiveness, 6. "behaviorality."

1. Kinds

Objectives have been categorized by many authors into three major types:

Cognitive objectives. Emphasis is on knowing, conceptualizing, comprehending, applying, synthesizing, evaluating; often verbal behavior is what is to be changed or added to (e.g., recall and organization of facts in African History).

Affective objectives. Emphasis is on attitudes, values, emotions; instruction is aimed at changing behavior and approach behaviors (e.g., increased signs of positive feelings toward learning. See Mager, 1968).

Psychomotor objectives. Physical skills and dexterity are involved; success in instruction involves teaching new skills or coordination of old ones (e.g., physical coordination involved in playing a good game of tennis).

2. Levels of Specificity

The teacher who follows Mager's instructions (1962) is likely to produce objectives all of which will have a high degree of specificity and which will resemble test items.

However a universal format for objective statements seems overly constraining and other authors propose a wider variety of levels of precision.

The issue of degree of specificity is a live one, discussed by a number of authors (e.g., Gagné 1965b). Jenkins and Deno (1970) point out that each level of objectives is appropriate to certain needs and certain persons. For example, broad, Level A objectives may be the appropriate mode for educational planners; rather specific Level C objectives may prove more useful to teachers or instructional designers. Briggs (1970) also suggests that a variety of kinds of statements of objectives are required for various purposes.

Krathwohl (1965) classifies objectives in a tripartite scheme. *Global* objectives can be refined into *intermediate* objectives (e.g., for a course) which in turn can be reduced to *specific* objectives, each representing a skill or concept.

Along similar lines Kibler, *et al.* (1970) suggest three levels of objectives: *planning* objectives which are very specific, *informational* objectives which are "abbreviations" of planning objectives, and broad *educational* objectives or goals.

For example:

Planning—"In a half-hour test at the end of the week, the student will be able to list the steps a bill follows through Congress, specifying the requirements for passage at each step. All steps must be included in the correct order, and the passage requirements must match the ones in the text book."

Informational—"The student will be able to list, in correct order, the steps a bill follows through Congress, specifying the requirements for passage in each step."

Educational—"To make students better citizens."

Gronlund (1970) provides a most articulate discussion of degree of specificity and illustrates how one moves from general to more precise statements.

Cohen (1970) slices the pie into slightly different segments, differentiating among goals, terminal objectives and interim objectives. His divisions suggest a combination of two dimensions: levels of specificity and sequence or time.

The consensus seems to be this: The objective should be just specific enough to accomplish the job for which it is designed (see Tyler, 1964). Different audiences or functions call for differentially specific objectives.

3. Levels of complexity

Discussions of more detailed specification are usually accompanied by descriptions of a taxonomy of *complexity*, with objectives being sorted into categories and arranged in a hierarchy. Taxonomies have been presented in detail by Bloom, *et al.* (1956), Krathwohl, *et al.* (1964), and Eiss and Harbeck (1969).

Examples of categories in a taxonomy (from Bloom,

et al.)

- 1.00 Knowledge
- 1.10 Knowledge of specifics
- 1.11 Knowledge of terminology
- 1.12 Knowledge of specific facts

-
- 4.00 Analysis
- 4.10 Analysis of elements
- 4.20 Analysis of relationships

A slightly different taxonomic scheme, for example one proposed by Gagné (1965a), involves categorizing objectives according to the behaviors involved and the conditions required to learn those behaviors.

Almost every author writing about behavioral objectives recognizes the need to provide some sort of ordering or sorting system. The large literature on taxonomies is considered relevant to the present paper but not directly so, therefore it is not covered in detail here. It may be enough to note that taxonomies are said to serve a number of valuable purposes in designing instruction sequencing units and providing adequate (comprehensive) evaluation.

4. Time line

Another dimension along which objectives vary runs from *immediate*, or short term, to *long range*, or life goals. Briggs (1970) designates four categories for his classification system: Life-long objective, end-of-course objective, unit objective and specific behavioral objective. While these categories parallel, to some extent, levels of complexity and of specificity it is also true that the unit goal will be reached before the course goal, etc., and so the categories may be said to represent a time-line dimension as well.

Within-course objectives also may be viewed on a sequential time line. Thus: Objective A: "discriminates colors" may be a prerequisite for Objective B: "matches objects on the basis of color and size." These intermediate or "enabling" objectives (see Taber, Glaser and Shaefer, 1965, and Ammerman and Melching, 1966 and 1971) are sometimes called sub-objectives or propaedeutic behaviors.

The point is that objectives may be organized in a hierarchy in which each successive objective can be reached only if the learner has acquired competence with regard to previous objectives.

5. Sample/whole

A common confusion in statements of objectives is between statements which represent the whole domain of the desired terminal behavior and statements of samples or symptoms. Traditional goal statements usually are attempts at delimiting whole goals. The more specific Mager-like statements often tend, like test items, to represent samples. Somewhat like specificity, this dimension seems to be related to size or magnitude. However specificity may be thought of as a linear dimension—a step-like pyramid. The sample/whole continuum is better visualized as areas spreading across a surface or as holes punched in a target.

Examples (from Gronlund):

"(Whole) Knows specific facts (American history)

- (Sample) 1. Identifies important dates, events, places and persons.
2. Describes the characteristics of a given historical period.
3. Lists important events in chronological order.
4. Relates events to their probable causes."

6. Behavioral/non-behavioral

Objections have been raised to the term *behavioral* on many grounds, some of which will be reviewed later. Relevant to this section are two objections:

(a) Instructional outcomes are not always observed behavior; they are often behavioral products. Thus, the teacher who states as an objective, "The student will write an acceptable essay on genetic science in the 19th Century," is obviously not going to observe or judge the actual behavior of writing. He is going to judge the product—the essay itself. Proponents of behavioral objectives would find this acceptable; a literal interpretation of the word "behavioral" would often violate common sense. (Actually, "observable objectives" might be a more appropriate phrase.)

(b) Some of the "acceptable" vocabulary of behavioral objectives is not behavioral. "To classify" is not really descriptive of behavior—it *implies* the actual behavior (e.g., picking up items from a set and dropping each in the appropriate box). There seems to be a grey area of vocabulary which, though literally non-behavioral, is precise enough to satisfy the experts.

Summary

Distinctions have been made among different kinds of behavioral objectives based upon a number of dimensions or attributes. Three of the major dimensions along which cognitive, affective or psychomotor objectives may vary are presented in graphic form in Figure 1.

The term "behavioral objectives" has been applied to at least three different kinds of statements.

(1) A list of objectives or sub-objectives may represent the *total*, broad objective of the instructional unit (e.g., when a performance, such as swimming using the back stroke, is being taught).

(2) A list of objectives or sub-objectives may represent a partial *sample* or a set of indicators of the whole objective (as in the example from Gronlund, above).

(3) A list of objectives or sub-objectives may represent a sequence of means, enabling objectives, or propaedeutic behaviors which prepare the student to emit (or to learn) the final objective.

Discrimination Between Behavioral Objectives and Similar Statements

1. Aims, goals, objectives

Teachers are likely to point out, as we did earlier,

that they have been stating objectives for years. Behavioral objectives however differ from these more traditional statements in several ways.

(a) The emphasis is on *observed* activity. Teachers of behavioral objectives emphasize this constraint; sometimes, as noted above, they even list acceptable and non-acceptable words.

(b) The emphasis is on *student* activity. Teachers often state objectives in terms of their activities ("For the first fifteen minutes I'll lecture on cell division") or in terms of content ("Cover mitosis"). The behavioral objective refers exclusively to student behaviors, not to the behavior of the teacher or machine.

(c) The emphasis is on *outcomes*. Teachers often state objectives in terms of process or procedure ("The class will discuss ethical issues concerning genetic control"). Behavioral objectives refer to terminal points in instruction. They state what a student will know or be able to do at the conclusion of a bit of instruction, not during it.

More traditional terms like "goals" and "aims" suggest less specific statements than does "objectives." On the other hand terms like "mastery item" or "test item" suggest more specificity than most authors would require for behavioral objectives.

Terms such as "lesson plan objective," "unit objective" or "teaching point" suggest specific goal statements. However, traditionally these statements have not met the requirements described above. They, like their larger, molar associates tend to describe materials, procedures, topics and content rather than outcomes of instruction in terms of student behaviors.

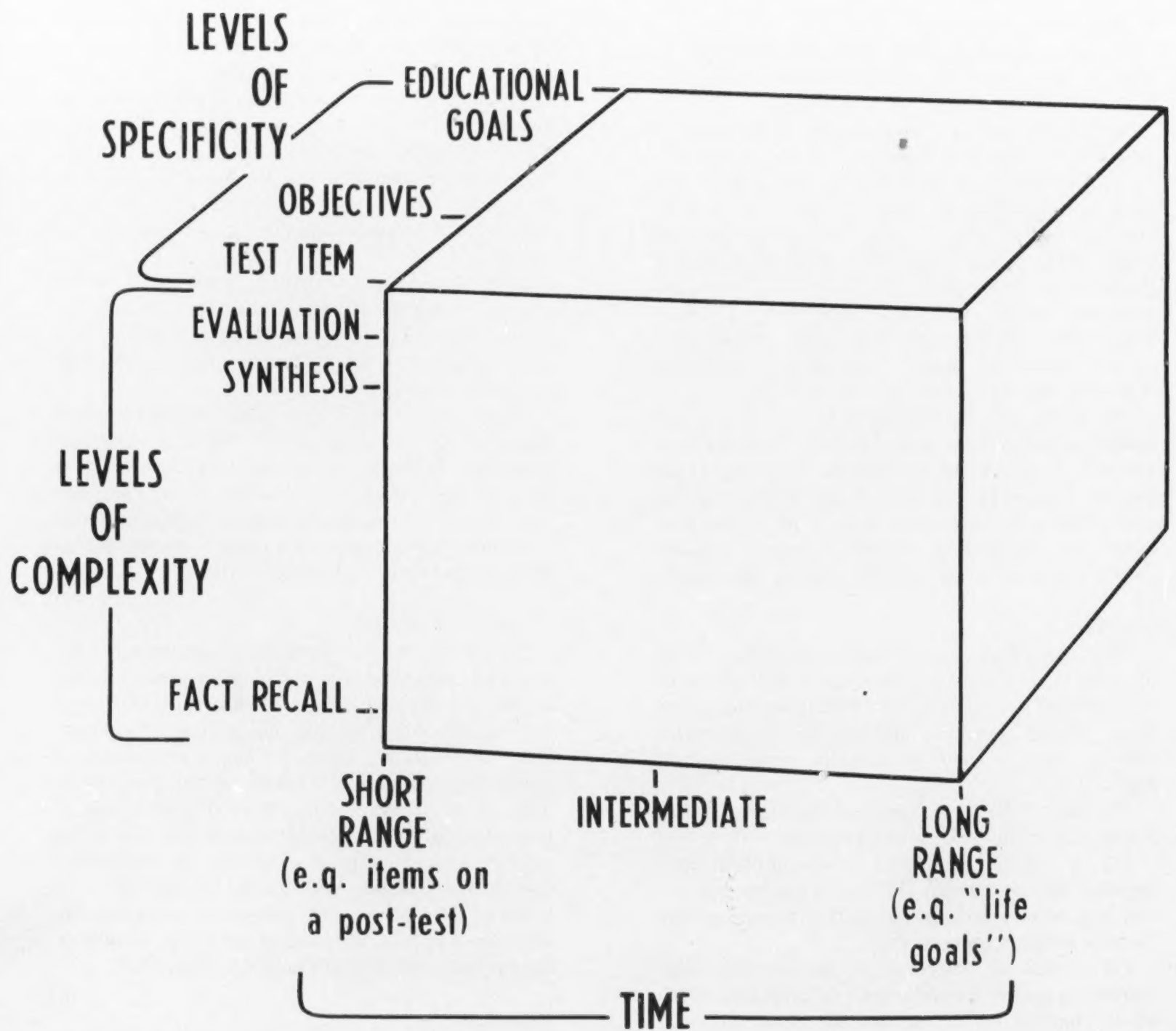
2. Objectives/outcomes

The words *objectives* and *outcomes* are sometimes confused. Objectives are the instructional outcomes desired and systematically worked toward. Obviously, instructional objectives may not always be achieved. More importantly, there are many outcomes of instruction; only a few of them correspond to objectives. Any change in the student that occurs as a result of instruction is an outcome. It follows that the stated objectives of a course of study do not represent a comprehensive catalog of all the changes the instruction is likely to produce. The problem of outcomes and objectives has been discussed by a number of authors. See for example Pace (1969) and Ammons (1969).

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FIGURE 1.



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WHY WRITE AND USE BEHAVIORAL OBJECTIVES?

Reasons Given in the Literature

The benefits and rationales recently proposed for behavioral objectives are similar to the ones suggested in earlier literature on educational goal-stating.

Before these are reviewed it should be mentioned that the added benefits of stating objectives in *behavioral*

terms arise from the reduced ambiguity of such statements. When a statement is operationalized—when the referents of the words in the statement are “point-at-able”—there will be a minimal amount of confusion and misunderstanding. (It is assumed that clarity and precision are *desiderata*. Of course, there are instances when it may be advantageous to maintain or even increase ambiguity and confusion as when explication will cause dissension or opposition.)

Lindvall (1964), for example, states unqualifiedly that: “. . . Statements of the purposes of education are truly meaningful only when they are made so specific as to tell exactly what a pupil is able to do after he has had a given learning experience.”

Assuming now that the more clearly and precisely an objective is stated the better it is, one might ask: “Better for what?”

Authors have come up with a variety of answers. In one paper Gagné (1965b) restates some reasons previously proposed by Tyler:

“1. Definitions of objectives are necessary to guide the behavior of the teacher.

2. Defining objectives for the student . . . (provides) him with a goal which he himself can use to organize his own learning activities.

3. . . . Unless the objectives are known, it is impossible to know what the student’s capabilities are at any given moment. This reason for objectives has often been stated in terms of requirements for measurement.”

Elsewhere Gagné (1965a) suggests a slightly different list:

—“There is virtually unanimous agreement that an important reason for specifying objectives is so that the terminal behavior which is aimed for can be known to the instructional designer.

— . . . The behaviorally defined objective has another related function. Because of its unambiguous nature, it can constitute a basis from which inferences can be made by the instructional designer about the kinds of behavior modification required . . . Actually this may turn out to be the most important reason for describing objectives, although it has not always been stated clearly. (Gagné has emphasized in his own extensive work this area of relating types of learning outcomes to types of learning experiences or conditions of learning.)

—An equally good reason for the specification of instructional objectives in terms of observable human performance is to meet the requirements of measurement . . .

—Some authors have stated that there is still a further reason for defining objectives: to make them known to the learner in order that he can carry out the matching procedure involved in reinforcement . . . (Objectives give) the learner prior knowledge which enables him to circumscribe, or bracket the variety of responses which is expected of him . . . (and) . . . may have the effect of controlling the reinforcement and thus improve the efficiency of the learning which occurs.”

Harless (1971) suggests statements of objectives are helpful because:

“—They tell you, the problem solver, how you will know when you’ve ACHIEVED. (And when you haven’t.)

—Objectives are a convenient way for COMMUNICATING intended achievements to others. (Superiors, subordinates, students, etc.)

—Objectives are the only way that MEASURES of achievement can be made systematically and scientifically.

—Objectives increase the probability that the remedy (training, environment changes, motivational systems, etc.) you develop will be RELEVANT to the problem.”

Kibler *et al.* (1970) include in their list of benefits such things as: the contribution to more effective learning when objectives are provided to students, aid in planning and sequencing instruction and communication to others.

Briggs (1970) provides a list of 21 uses of written objectives, many of which are more detailed statements of points already made. He adds, among others, the use of objectives in communicating to others in a team involved in designing instruction.

Popham (1971) emphasizes using behavioral goals in three areas: in curriculum, instruction, and evaluation (including evaluation of the teacher).

Summary of Benefits

A summary categorization of the reasons listed in the literature reveals that objectives are said to be beneficial for very different reasons and, a point made in a previous section, they may serve different purposes with different audiences.

Objectives may be used in one or more of these major ways:

1. Managing instruction

Many of the proposed specific uses of objectives fall into this broad category. Thus:

(a) Objectives may be used by teachers, students or others in sorting and directing learners. Adaptation to individual differences can be enhanced when objectives are used as the basis for systematic pre-testing, allowing into the course students who demonstrate the required prerequisite behaviors, redirecting to remedial work those who lack the prerequisites, skipping ahead those who already have acquired the behaviors which the unit is designed to teach. These branching and sorting routines can be applied microscopically to small units of instruction also.

(b) Closely related to routing is *exiting*. The decision to stop teaching someone, if it were rationally based, would rest on data indicating the student’s degree of competence. Using a mastery model (see, for example Block, 1971) the teacher would allow students to exit from instruction when they had demonstrated achievement of prescribed behavioral objectives.

2. Managing learning

Whereas management of instruction implies that the control rests with the teacher or administrator,

management of learning suggests a more active role by the student. Given sets of objectives the student can, for example, choose among them, planning his own course of learning more effectively and rationally. He can use objectives to guide his learning efforts—choosing appropriate materials, reading selectively, etc. He can use objectives for self-evaluation which in turn may direct his efforts (e.g., he may skip ahead or review).

3. Planning instruction

Given sets of objectives, the teacher can more rationally sequence instruction, allot time to topics, assemble materials, prepare outlines and booklists, etc. Even on the more molecular level objectives can be used for a guide to teaching, as when a lecturer plans and executes his lecture guided by a behavioral objective outline.

As Gagné (1965a) emphasizes: the stating of behavioral objectives provides the basis for a new analysis and design of instruction, one which involves setting up conditions of learning that are appropriate to each objective. He stresses repeatedly the immediate implications for instruction of: stating objectives, classifying them by types, and then relating types of objectives to types of instruction.

A re-examination of course content may result from a perusal of behavioral objectives for the course. The teacher may realize that much of the content is irrelevant or (more often) is a means toward an end (e.g., a series of examples illustrating the rule or concept to be learned). Such a realization has implications for content revision and for testing and grading. Thus it would seem inappropriate and unfair to hold students responsible for (i.e., to test them on) materials which are illustrative, but of which mastery is not in itself an objective.

4. Enhancing learning

It has been mentioned earlier that reinforcement of learning may be made more effective and explicit when the student has a set of objectives paralleling his learning experiences. Some of the techniques (e.g., student choice) which currently are being suggested as ways to improve instruction are dependent upon statements of behavioral objectives.

5. Facilitating evaluation

Behavioral objectives are said to facilitate various evaluation activities: evaluating the student, evaluating instruction, evaluating the curriculum (i.e., its purposes and aims). Such evaluation can be cast in traditional terms, for example, as a basis for grading, or in more innovative ones (e.g., levels of competence in a mastery learning system). Increasingly in education there is emphasis on evaluation for many different purposes; statements of objectives are the first steps in developing adequate evaluation tools. Of particular interest to the reader who wishes to relate behavioral objectives to test item construction is a little book by Payne (1968).

6. Aiding in communication with others

There is always a need to communicate educational

objectives to others. Already mentioned is the communication by teacher to student and by instructional development personnel with each other, with technologists (e.g., media specialists), with teachers, etc. In addition, precise descriptions of goals are useful to administrators engaged in overall curriculum planning, to parents and other members of the community, to sponsors in foundations or government agencies, etc. It was pointed out earlier that different versions of the same basic statement may be appropriate to different audiences.

7. Designing or redesigning curriculum

Earlier mention was made of the uses of objectives in managing and planning instruction. Typically the teacher setting out to improve instruction begins with a given content (e.g., beginning algebra, introductory physics) and generates objectives, new materials, etc., based on that content. Modern principles and techniques of instructional design have emerged not primarily from education but from training. Here the designer begins with a job or job specifications rather than a given content. In a nut shell: Educational objectives tend to arise from *subject matter*; training objectives tend to arise from and be focused on *performance*. We will return to this point later in the section on Where Do Behavioral Objectives Come From.

Entirely new curricula which are basically the sum total of objectives that have been derived from job analysis may more readily emerge in industrial and military training areas than in traditional education. Authors with experience in training tend to emphasize the benefit of behavioral objectives in generating new, or redesigning old, curriculum.

While this benefit does not seem as likely to occur in the educational context, some moves in that direction might be mentioned.

—Explication of existing curriculum (say, within a department or school) draws attention to redundancy and to omissions which in turn can lead to curriculum revision.

—Sets of objectives for one course may be compared with the expected entry behaviors for the next course in the sequence. The two should interlock; where they do not curriculum adjustments may be made.

—In some areas of vocational and professional education attempts are being made to begin with performance and work backwards to curriculum. Medical education especially provides many examples of this (see reference note under: "University of California").

8. Producing new insights

There remains one benefit that instructional designers talk about but rarely write about. The process of clarifying objectives is said to produce major changes in those who engage in the effort.

For example, teachers (as well as others such as parents or administrators) who spend time explicating

behavioral objectives are said to acquire increased humility about what is a feasible goal. When global goals are explicated, scores of specific sub-goals emerge. It often develops that it is not possible to reach all of them and so a hierarchy or "trade-off system" of goals must be produced.

The writing of objectives focuses attention away from content and onto the student and, it is said, this re-focusing often produces revision in teaching methods.

Students who help design objectives are made aware of the difficulties of defining what it is they want to learn and of choosing among equally attractive options.

Parents and administrators cooperating in setting goals not only bring information to the teacher about community values but also discover points of disagreement that remain hidden when more ambiguous statements of goals are employed.

It is said that explication of goals often leads to a re-examination of the contribution of instruction. Harless (1970), Geis (1966), Mager and Pipe (1970), and others have stressed that many apparent "instructional problems" when analyzed more carefully turn out to be amenable to solutions which do not involve instruction at all.

These are some of the speculations advanced by specialists in the area. They are mainly supported by anecdote; however they seem to be similar to claims made in other fields about the efficacy of the process of explicating goals: examples might be drawn from such diverse fields as management and psychotherapy.

Opponents and Proponents

The next section reviews the experimental evidence indicating whether the proposed benefits of behavioral objectives are in fact real. It is a relatively short section because of the small amount of research that has been conducted thus far.

When there are few facts, the near-vacuum created is likely to be filled by fiery polemics and disputation. So it is with behavioral objectives. Much of the extensive literature consists of fervent evangelical crusades aimed at getting teachers to state objectives and equally dramatic attacks on that activity, practically indicating that it is the work of the devil.

Amid the clatter there are some sophisticated and articulate criticisms (see for example Atkin, 1968) and rebuttals (see for example Popham, 1969). See also the Question and Answer sections in Cohen, 1970. An outstanding symposium involving proponents and opponents was conducted by the American Educational Research Association and is available in the form of a monograph (see Popham, 1969). See also Part VIII of Kapfer (1971) which presents half a dozen papers that provide a variety of probing criticisms of behavioral objectives.

Some experts who are equally committed to finding more effective means of instruction and evaluation object to the strategy proposed by proponents of

behavioral objectives. They worry that teachers and instructional designers will become bogged down at the objective-writing state. A more profitable strategy, they suggest, may be to move directly from vague objectives to test items. See for example, Evans (1968) and Grobman (1968). This point will be reviewed in the Summary section.

Two cautions should be borne in mind in discussions of behavioral objectives:

(1) The claimed effectiveness of behavioral objectives with regard to the proposed uses remains to be demonstrated. Nor are there demonstrations that behavioral objectives do *not* lend to the proposed benefits. The issue is simply unresolved at this time.

(2) The mere stating of behavioral objectives will not in itself lead to the results indicated in many cases. For example, when authors talk of the use of behavioral objectives in evaluation they are abbreviating the evaluation process. Only in some cases is a behavioral objective synonymous with a performance test, more often test materials must be designed. It may be true that objectives are a first step toward, and a guide in, developing a sound test; but often the sophisticated test instrument must be more than a one or two sentence objective. In summary, the second caution suggests that the behavioral objective may require elaboration before the teacher or instructional designer can use it in the manner suggested.

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University of California. Using a performance analysis approach to curriculum design, the Allied Health Professions Project has produced a number of analyses of occupations and accompanying curriculum designs and materials. A description and publication order form can be obtained from: Publications, UCLA Allied Health Professions Research and Instruction Projects, 1003 Wilshire Boulevard, Santa Monica, California 90401.

EXPERIMENTAL EVIDENCE OF BENEFITS

Direct Use by Student

It seems obvious that student access to instructional objectives will facilitate his learning. The student can better direct his study if he knows where he is supposed to be going (i.e., he can rationally select parts of the instruction to attend to). He can more accurately estimate his progress if he has an unambiguous set of objectives to serve as benchmarks. He can organize his learnings more effectively if he has objectives to serve as overviews and structures.

Research on the effectiveness of objectives as used by students is sparse and contradictory. Some of the fogginess is due to major variations among studies (e.g., different student populations, different degrees of specificity of objectives). Also the research designs tend to be of the classical group comparison type. Thus, one set of students is given objectives before instruction, another is not; then average posttest scores are compared. Such a design suffers from a number of flaws. Two major ones are: (a) if the treatment has different effects on different types of students, the evidence for effectiveness may be lost when data are grouped; (b) the specific attributes of the treatment (i.e., the "values of each parameter") may not be ones which in combination produce an effect. A different set of values might do so. Thus a more effective experimental strategy would be *manipulative* (à la Sidman, 1960). A great variety of kinds of objectives, advanced organizers, etc. would be examined and would be changed until one mixture proved to enhance learning. (Or alternatively, no tested mixture or treatment shows an effect and *E* surrenders in the face of exhaustion.)

Much of the literature is in the form of doctoral theses. Since such references are often difficult to obtain and since the data do not conclusively alter the conclusions (or lack of them) one would draw from the published literature, they are omitted in this review.¹

One set of studies falls into the general category: Objectives versus no objectives, although the specific studies represent variations on that theme.

Some investigators find a clear advantage (in terms of superior posttest achievement) for students who have been given objectives: e.g., Blaney and McKie (1969), Dalis (1970). Other studies fail to show a significant difference between the group given objectives and other

¹The author is deeply indebted to Mr. Philippe C. Duchastel of the CAI Center at Florida State University who is preparing an extensive review of the literature and who graciously permitted me to read a draft of the paper and excerpt some information from it.

groups: e.g., Oswald and Fletcher (1970).

Comparisons of specific versus general objectives yield similarly ambiguous results. Jenkins and Deno (1971) and Oswald and Fletcher (1970) find no difference between groups given specific and groups given general objectives. Tiemann (1968) on the other hand reports a difference in retention scores favoring the specific objectives group and Dalis (1970) shows superiority for the group that had precisely stated objectives over the group that had vaguely stated ones.

Comparisons have been made between behavioral objectives and other kinds of information accessory to the core learning materials.

Blaney and McKie (1969) find objectives are more effective than a general introduction though no more effective than a pretest. Not all studies show that behavioral objectives are superior to other "information accessories." Yelon and Schmidt (1971) fail to show that behavioral objectives are superior to instructions in learning a game.

Achievement is not the sole dependent variable that has been observed in this research. Process variables (the effect of objectives on the students' behaviors while learning) have been studied by Mager and McCann (reported in Mager and Clark, 1963): time to complete a course of study, and Merrill (1970): time and number of examples required.

Related research should be noted. For example the reader is directed to Frase (1970) for a review of questions as orienting stimuli and Ausubel (1968) for a discussion of advance organizers. Both of these kinds of study materials are said to have some functions similar to those claimed for behavioral objectives.

Regardless of the ambiguous nature of the effectiveness of supplying objectives in terms of improved learning there may be another reason for doing so. Cohen (1970) observes that students in junior colleges ranked "specific learning objectives" as first among those things students look forward to when they enter a class for the first time. Providing them with objectives may produce a more positive effect toward the course, subject matter, and learning in general.

An easy way to conclude this section would be to provide a score card (a count of studies which show and which do not show significant results). The question of what kinds of pre-instructional information provided to students facilitate learning is too important to be answered by such a shoddy trick. It is clear that we do not know the answer. It is also clear that providing students with something the teacher or experimenter terms "objectives" does not inevitably improve learning. Obviously this does not mean that some kind of pre-instructional information cannot aid the student. The results merely confirm our common sense observation that since learning is a complex phenomenon, no patent medicine panacea (e.g., some

ill-defined set of verbal statements given to a student before instruction) is, or is likely to become, available. On the other hand teachers and researchers ought not to be discouraged from investigating and trying out pre-instructional information. Generations of learners tell us that some kind of previewing or outlining helps. It is unlikely they are wrong. It is more likely we have so far been simplistic in our approach to the area.

Evidence of Other Benefits

Of the claimed benefits for objectives the only other one that has been researched seems to be use by teachers.

Baker reported a relevant study (1969) in which high school social studies teachers were assigned to one of three groups. Two of the groups received behavioral objectives, the remaining group was given non-behavioral objectives. All teachers were instructed to teach to the objectives in their classes. Achievement test scores did not indicate any difference between students in the experimental and control classes. However the author adds, "Teachers' faulty understanding of objectives, indicated by their inability to provide relevant classroom practice and to identify, when asked, test items measuring given objectives, may have accounted for the lack of differences."

Baker suggests that the results might be different if the teachers had been thoroughly trained in the use of behavioral objectives, if they were clearly committed to producing specific behavioral changes in students, and if they were willing and able to change established instructional routines.

McNeil (1967) reported a series of three studies, one of which has bearing on the present question. Elementary school student-teachers were given instructions which focused their attention either on outcomes or on procedures. Students who were taught by teachers in the outcome, or objective-emphasized, group showed significantly higher achievement than those taught by teachers in the procedure-emphasized group.

Jenkins and Deno (1971) provided general or specific objectives to (a) teachers, (b) students, or, (c) students and teachers. They report, "Neither knowledge of objectives nor type of objectives differentially influenced performance on a criterion test." The teachers were senior students in secondary education. The students were sophomores in an educational psychology course. Along with some other possible "explanations" of the data, the authors note that "when a unit is well structured, that is, designed to facilitate the attainment of particular objectives, explicitly stated objectives may be superfluous." They also conclude "... the argument which suggests that explicitly stating behavioral objectives produces improvement in learning is a difficult argument to support empirically."

It is somewhat disheartening to end the review of the

literature on that note, having travelled from mere uncertainty to near-despair. One must of course realize that only a few studies have been carried out as of this writing and that for some of the most important benefits there is as yet no evidence, pro or con.

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WHERE DO OBJECTIVES COME FROM?

This question can have either of two meanings. It can mean: What are the sources of strength which direct a producer of objectives to write or select the particular ones he does? This is dealt with under the heading *Origins*. The question can also mean: Where can I get objectives? Answers to this question can be found in the latter two sections entitled *Choosing* and *Producing*.

Origins and Influences

1. Literature on goals

Tyler (1949), McNeil (1969) and many others have suggested sources which either may or should contribute to goal-setting in education. Typically the general areas are designated as Student, Society and Subject. Even a brief excursion into the literature on educational goals would take us far beyond the confines of the present paper.

Who should set goals for education? What should those goals be? How should one go about the process of cooperative goal-setting? Discussions of these issues bulk large in the educational literature. And well they might, for the equally large or even larger segment of the literature concerned with methodology represents only means to these ends. Continued and widening debate on educational goals can be predicted for the coming decades. It is with some hesitancy, then, that this literature is passed over here and attention is paid primarily to sources which are mentioned by authors in the literature on behavioral objectives.

2. Content versus performance

A point that was made in the section on Designing Curriculum deserves repeating here. Two sources have contributed to the current emphasis on behavioral objectives: training (industrial, military) and education.

The traditional distinction between training and education may oversimplify the case but it is useful. The

behavioral objectives and the post-test are often isomorphic, i.e., the behavioral objective is a checklist of the final performance. Education, it is said, does not produce such predictable results; at least specifying all of the outcomes would be unfeasible even if it were possible. Regardless of the validity of this statement it correctly represents the attitudes of most teachers. In part that attitude arises because rightly or wrongly the sources of objectives are very different in education. Teachers do not begin with a job and work backwards to a curriculum. They start with a content and work forward to an output. The teacher usually sees his job as transferring a content, a body of knowledge, a subject matter from himself (and adjunct materials) to the student.

Much of the debate about behavioral objectives, and many of the difficulties instructional experts have had in teaching teachers about instructional objectives, seem to arise because those experts have come out of a training environment. When training is being planned for a specific job, the trainers have an obvious source of objectives: performance on the job. But, while objectives generated by trainers arise from performance, those generated by teachers arise from content.

Gronlund (1970) has been one of the few proponents of objectives who has taken this into account, and his book provides a means for a teacher to move toward behavioral objectives within the content milieu that is familiar to the teacher.

Some educators have adopted the training model almost *in toto*. They *do* begin with performance and work back toward building a curriculum, as was pointed out in the Designing Curriculum section. A number of papers describe this performance approach to curriculum development in the educational, as contrasted with the training, context (see for example, Geis, 1970).

For specific examples of task analysis in education the reader is referred to Mechner (1965) who presents an analysis of science education, and Lane (1965) who provides a behavioral analysis of second language learning.

One reason for moving backwards from final performance to curriculum is to insure the *validity* of curriculum objectives and content. If one starts with an examination of the final job to be performed and derives teaching objectives from it, those objectives, and the related teaching content, are very likely to be relevant to the final performance. On the other hand, it is often pointed out, objectives derived from subject matter may not be relevant to "real world" performance. Nevertheless it is important to note that large numbers of behavioral objectives have been content-derived.

Regardless of the source (i.e., content or performance) some sort of categorization is often proposed. *Task analysis* is a term usually applied to the analysis of a performance into general categories. A large literature on this subject, in good part representing studies in industrial and military training, is available.

Categorizing by contents, assumed mental processes or appropriate conditions of learning is usually found under the heading *taxonomies*. We have already referred to this literature and urge the reader to become at least superficially acquainted with it.

3. Interested persons

Although performance and subject matter content are two basic sources for objectives there are other important influences as well.

Experts in curriculum planning tend to design an ideal model of rational decision making and bemoan the fact that there is an enormous mismatch between it and observations of real-life curriculum making. The influence of outsiders is seen as somehow unfortunate and disruptive. Yet it is obvious that not only broad goals but very specific objectives in education are set, revised, or eliminated by a political process involving a great number of interested persons. Moving away from the school itself, ever widening circles in society press their influences on curriculum makers. In a recent review Kirst and Walker (1971) cited as influential such diverse groups as accrediting agencies, teachers' associations, private foundations, suppliers of teaching materials, and test constructors. The answer to the question: Who *should* generate goals for education? is not likely to be the same as the answer to: Who *does* set goals in education?

While the teacher generating behavioral objectives for a course may not be directly influenced by such groups, he is probably aware of their influence and his output may well be subjected to their scrutiny. The present brief paper can only note that the business of objective setting is likely to be a complex political one at least once it reaches beyond a single classroom.

The influence of others need not be viewed as unfortunate. Curriculum designers and teachers may well find that objectives and accompanying curriculum content will have increased validity and greater acceptance if other teachers, subject matter experts, and administrators are consulted during the process of deriving and selecting objectives. With the recent emphasis on student participation in all aspects of education, the student might well be a partner in setting objectives. Some recent, exciting examples of student participation in goal-setting (e.g., Project PLAN) use the activity as a major part of a students' education in decision-making, planning, etc. Holland (1969) for one has suggested that true choice in education is something of a sham as long as "freedom" involves the student in choosing only means and not ends or purposes.

Procedures which involve groups of teachers in writing specific behavioral objectives (say, within a department or area) may prove to be the most effective way to operationalize and rationally examine a large curriculum.

Attention recently has been directed to the processes of goal-setting by groups in education. Specific

techniques are being investigated and the area looks like one that will grow rapidly in the next decade. One example of these efforts is the work carried out through the National Laboratory for Higher Education (see Uhl, 1971).

One point is clear: As goals in education become more explicit and specific they can be more easily examined (and criticized) by others. Therefore it seems wise if one is going to explicate objectives to involve many interested people in the process from the outset.

4. External requirements

Especially within the academic world, objective-stating is constrained by a number of "outside" influences. Curriculum guides may be suggestive or they may represent legal requirements. The next course in a sequence may provide numerous requirements for the preceding course. Uniform examinations (state examinations, commercially produced tests) similarly influence the curriculum planner.

At higher levels of education institutional accreditation requirements must be considered. Professional licensing and accreditation within specific fields add further constraints.

As was pointed out in the previous section such constraints need not be viewed negatively—they are sources to be consulted. They are often the framework within which specific course objectives must fit. The designer of objectives ought to be aware of, and make maximal use of, these sources.

Choosing From Existing Objectives

Objectives are a product. The teacher or instructional designer is a consumer of objectives. Any consumer is faced with the question: To buy or to make. If the decision is "to buy" there are several sources of ready-made objectives from which selection can be made.

Of course, curriculum guides and guides accompanying text books or other teaching materials may provide objectives. However, for the most part they tend to be stated in more traditional form and do not strictly meet the criteria for behavioral objectives previously discussed in this paper.

Specific sets of objectives are available in a great variety of subject matters, usually having been developed by one person or team. The comprehensive bibliography by Poulliotte and Peters (1971), referred to earlier, references scores of sets of objectives in areas ranging from foreign languages to performing arts. In addition the bibliography includes references to published objectives that are available for different academic levels (e.g., early childhood, junior college, special education). It should be noted that many of these documents are available through the ERIC Clearinghouse system.

As well, sets of objectives are often part of a book on a specific subject matter. These may range from a few

sample objectives to a very comprehensive treatment (e.g., Nedelsky, 1965, Kearny, 1953, French, 1957).

Sometimes professional associations interested in education in a specific discipline issue sets of behavioral objectives for their area (e.g., National Council of Teachers of Mathematics, 1961).

Journals devoted to a discipline, such as the *Journal of Medical Education* or *National Council of Teachers of English Journal* occasionally include articles which describe specific objectives for an area of the curriculum. The literature on education research (e.g., *Encyclopedia of Educational Research*, the *Review of Educational Research*) provides another source.

The Instructional Objectives Exchange (IOX) is a recent and exciting development in this area. Both objectives and sample measurement items are available for a wide variety of subject matters and over a wide range of academic levels. Some of these were developed by the IOX staff, others were submitted by teachers, schools or school districts. A quality control system based on feedback from teachers is being developed which should in time add valuable information. More information about the exchange may be obtained by writing: Instructional Objectives Exchange, Center for the Study of Evaluation, UCLA Graduate School of Education, Los Angeles, California 90024.

Producing Your Own Objectives

Instructional designers have produced a sizeable number of programs, books, films and other materials which are designed to teach the skills of stating behavioral objectives. The assumption is usually made by these authors that the problem of *sources* for objectives is taken care of. That is, only in a few cases is space devoted to teaching task analysis as a source of objectives or in pointing to persons and materials which may be of use in generating objectives. The Origins and Influences section of this paper attempted to suggest the importance of this problem.

However, given a source the reader may be aided in casting goals in the form of behavioral objectives by using one or more of the references listed in the How-To section upcoming.

1. Relevant sources

Starting to write objectives with nothing but a pen and a blank sheet of paper handy can lead to paralysis. As mentioned previously, a careful task analysis can serve as an excellent source for objectives. Writers of objectives who are working instead from content might wish to use a variety of textual sources. Here are some suggestions:

- Assemble and review your quizzes, assignments, laboratory exercises, final examinations.

- Assemble and review your class outlines and those of people who teach the same or similar courses.

- Look over lists of written objectives by others (see the references in the section on Choosing From Existing Objectives).

—Peruse the Taxonomies—both general ones and those specific to your subject area (see the section on Levels of Complexity).

—Check objectives, summaries, outlines, thought questions, etc., in textbooks.

—Consult curriculum guides and outlines in your area.

Experts in writing behavioral objectives would caution the novice not to slavishly convert a content statement, derived say, from a textbook index, into a behavioral objective. Rather the original statement should be used as a hint, a prod, a reminder.

The writer might then think of what *behavioral* content could be related to the subject matter content. Thus: starting with "Economic policies of Australia," he might move first to "Understanding Australia's economic policies," then to "Describe and compare the economic policies of Australia and those of Canada for the period 1950-60 with reference to trade treaties, import duties. . . ."

2. How-to

Below is an annotated list of "how-to" books. It is not complete. New materials appear each month. Furthermore many instructional units on how to state behavioral objectives are part of a project or in-house publication, or have been developed locally for specific use in a school, workshop series, etc. Films and audio tapes are omitted from the list. Most of these are descriptive or motivational rather than directed at skill-building.

Robert J. Armstrong, Terry D. Cornell, Robert E. Kraner, and E. Wayne Roberson, *The Development and Evaluation of Behavioral Objectives*, Charles A. Jones Publishing Company, Village Green, 698 High Street, Worthington, Ohio 43085 (a division of Wadsworth Publishing Company), 1970, 109 pp., \$2.95.

A brief, general discussion of objectives is followed by a chapter on behavioral objectives which is aimed at teaching the reader how to critique and write objectives. Later chapters deal with measurement of behavior and incorporating objectives into the evaluation process. Nine self-tests are included. The authors suggest that the book would be useful to administrators and teachers at all levels of education and could be used as a text in teacher-training programs.

Robert L. Baker and Richard E. Schutz, eds., *Instructional Product Development*, Van Nostrand Reinhold Company, New York, 1971, 287 pp., \$7.95.

This is a programmed-style book consisting of seven units, each by different authors. The first three units are clearly relevant to stating objectives. The text is brief and easy to read, frequent test-yourself items are included. Examples are drawn from a variety of educational levels.

Dale M. Brethower, et al., *Programmed Learning: A Practicum*, Ann Arbor Publishers, Ann Arbor, Michigan, 1965, 247 pp., \$7.50 hardbound, \$5 paperback.

This programmed textbook gives examples of programmed learning, an overview of stating objectives, writing criterion frames (which are test items for objectives), relating objectives to criterion frames, and testing. The examples and exercises are primarily directed at training problems in industry. Of special relevance to stating objectives are pp. 45-102.

Leslie J. Briggs, *Handbook of Procedures for the Design of Instruction*, American Institute for Research, 135 North Bellefield Avenue, Pittsburgh, Pa. 15213, 216 pp., \$5.50.

This monograph presents a set of procedures ("a model") for the design of instruction based upon Gagné's taxonomy. This "self-instructional" handbook would be useful for planners, developers and users of instructional materials either in a one-man authorship situation, or on a large curriculum development project. Of special relevance to stating objectives at pp. 1-46.

Vincent N. Campbell and D. G. Markle, *Identifying and Formulating Educational Problems*, Far West Laboratory for Educational Research and Development, Berkeley, California, 1967, \$3.29.

While not exactly a "how-to" book, this most interesting report describes an attempt at developing effective techniques for identifying educational needs and formulating them as well defined problems. The extraction of good objectives is more difficult than stating those objectives behaviorally.

Arthur M. Cohen, *Objectives for College Courses*, Glencoe Press, A Division of The Macmillan Company, 8701 Wilshire Boulevard, Beverly Hills, California 90211, 1970, 144 pp., \$2.95.

This book includes a programmed lesson in objectives writing as well as chapters on: Definitions of Terms, Goals and Objectives in Sequence, Implications of the Process, and Criticisms and Caveats. One chapter presents in detail about 100 specimen objectives for various college courses. Appendices include checklists and a bibliography of articles on behavioral objectives.

James E. Espich and B. Williams, *Developing Programmed Instructional Materials*, Fearon Publishers, Belmont, California, 1967, 138 pp., \$3.

Chapter 3 of this book provides an outline of an interesting technique for explicating objectives using a dialogue between subject matter expert and "programmer."

Norman E. Gronlund, *Stating Behavioral Objectives for Classroom Instruction*, The Macmillan Company, New York, 1970, 64 pp., \$1.50.

The author explains how to state objectives in behavioral terms and suggests where to get ideas for instructional objectives. Additional suggestions are made concerning how the instructor might use behavioral objectives in measuring student performance. Based on

Bloom's taxonomy, the book is aimed primarily at elementary and secondary school teachers.

Robert J. Kibler, Larry L. Barker, and David T. Miles, *Behavioral Objectives and Instruction*, Allyn and Bacon Publishers, 470 Atlantic Avenue, Boston, Mass., 1970, 196 pp., \$3.95.

This book discusses the different types of educational objectives, controversial issues regarding behavioral objectives, the general model of instruction, how to plan objectives, how to write informational objectives and the influence of behavioral objectives in education. Samples of behavioral objectives are given.

Robert F. Mager, *Preparing Instructional Objectives*, Fearon Publishers, Belmont, California, 1962, 61 pp., \$1.75.

This programmed book is concerned with designing usefully stated objectives rather than with selecting them. It is by now the classic book on how to write instructional objectives.

H. H. McAshan, *Writing Behavioral Objectives: A New Approach*, Harper and Row, New York, 1970, 116 pp., \$2.50.

Each chapter in this paperback text provides a check-test at the beginning. No background in teaching, curriculum development or objective writing is assumed. It is designed to be used individually or in a workshop. Chapters include: Behavioral Objective Components, Developing Goal Statements, Identification of Evaluation Activities, Completing the Writing Process, Unique Writing Problems and Guidelines for Writing Objectives.

Peter Pipe, *Practical Programming*, Holt, Rinehart and Winston, Inc., New York, 1966, 70 pp., \$1.95.

A short text designed to teach programmed instruction, it has relevance, nevertheless, to general instructional design. See especially Chapter 3 (pp. 18-32).

W. James Popham and Eva L. Baker, *Establishing Instructional Goals*, Prentice-Hall, Englewood Cliffs, New Jersey, 1970, 130 pp., \$4.95 hardbound, \$2.25 paperback.

This book consists of five self-instructional programs which focus on instructional goals: how to select them, how to state them, and how to establish pupil performance standards for such goals.

W. James Popham and Eva L. Baker, *Systematic Instruction*, Prentice-Hall, Englewood Cliffs, New Jersey, 1970, 166 pp., \$2.25 paperback.

This book is designed primarily for primary and secondary school teachers and covers instruction in general. Chapters 2, 3, 5, and 9 are relevant to the instructor interested in stating behavioral objectives and evaluating his instruction with reference to them.

Harold F. Rahmlow, "Specifying Useful Instructional Objectives," *National Society for Programmed Instruction Journal*, Vol. VII, No. 7, 1968, pp. 10-13.

This article describes a four-step routine for objective writing with a special emphasis upon avoiding triviality in writing objectives. The routine consists of: drafting the objective, writing a sample test item for the objective, specifying the principal performance criteria for the objective and specifying the appropriate learning activities.

Julian I. Taber, Robert Glaser, and Halmuth H. Schaefer, *Learning and Programmed Instruction*, Addison-Wesley Company, Inc., Reading, Mass., 1965, 182 pp., \$5.95.

This is a general text on designing instruction with chapters concerning relevant psychological theory, specific design of materials, tryout and research. See especially pp. 3-4 and 62-86.

William Clark Trow, "Behavioral Objectives in Education," *Educational Technology*, Vol. 7, December 30, 1967, pp. 6-10.

This article suggests that behavioral objectives, although properly stated, can be misused. The maxims suggested to avoid the misuses of behavioral objectives include: do not keep the objectives a secret from the students, teach the students how they can learn what is expected, and limit the objectives to things for which students have the necessary prerequisites.

Julie S. Vargas, *Writing Worthwhile Behavioral Objectives*, Harper and Row Publishers, 1972, 185 pp., \$2.95.

This self-instructional text attempts to teach "the fundamentals of writing (cognitive) objectives and discusses what should be taught and why." It also includes discussions of understanding, concept formation and creativity. Bloom's taxonomy serves as an organizing system. Examples are drawn from a variety of disciplines and grade levels. Pretests, exercises, etc. are included.

Henry H. Walbesser, *Constructing Behavioral Objectives*, Second Edition, Bureau of Educational Research and Field Services, University of Maryland, 1970, 186 pp.

This programmed text shows how to identify and construct behavioral objectives. It is aimed at primary and secondary school level needs.

Stephen L. Yelon and Roger O. Scott, *A Strategy for Writing Objectives*, Kendall-Hunt, Dubuque, Iowa, 1970, 62 pp.

This programmed text is designed to help teachers write behavioral objectives and to select appropriate tests. It is addressed to the problem of writing objectives for college level instruction as well as for lower levels. A variety of uses of instructional objectives are suggested.

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Will French, *Behavioral Goals of General Education in High Schools*, Russell Sage Foundation, New York, 1957, 235 pp., \$5.50.

George L. Geis, "Premature Instruction," *Educational Technology*, Vol. X, No. 4, April 1970, pp. 24-30, and in Richard W. Burns and Gary D. Brooks, eds., *Curriculum Design in a Changing Society*, Educational Technology Publications, Englewood Cliffs, New Jersey, 1970, pp. 81-102, \$8.95.

Norman E. Gronlund, *Stating Behavioral Objectives for Classroom Instruction*, Macmillan Company, New York, 1970, 64 pp., \$1.50.

James G. Holland, "The Misplaced Adaptation to Individual Differences," Paper presented at the Annual Meeting of the American Psychological Association, 1969.

Nolan C. Kearny, *Elementary School Objectives*, Russell Sage Foundation, New York, 1953, 189 pp., \$5.50.

Michael W. Kirst and Decker F. Walker, "An Analysis of Curriculum Policy-Making," *Review of Education Research*, Vol. 41, No. 5, December 1971, pp. 479-509.

Harlan Lane, "Programed Learning of a Second Language," in Robert Glaser, *Teaching Machines and Programed Learning, II*, Department of Audiovisual Instruction (now AECT, Association for Educational Communications and Technology), National Education Association, 1965, pp. 584-643, \$11.50.

John D. McNeil, "Forces Influencing Curriculum," *Review of Educational Research*, Vol. 39, June 1969, pp. 293-318.

Francis Mechner, "Science Education and Behavioral Technology," in Robert Glaser, *Teaching Machines and Programed Learning, II*, Department of Audiovisual Instruction (now AECT, Association for Educational Communications and Technology), National Education Association, 1965, pp. 441-507, \$11.50.

National Council of Teachers of Mathematics, *Evaluation in Mathematics*, Dinonan A. Johnson, ed., Twenty-Sixth Yearbook, The National Council, Washington, 1961, \$3.

Leo Nedelsky, *Science Teaching and Testing*, Harcourt, Brace and World, Inc., New York, 1965, \$9.75.

Carol A. Poulliotte and Marjorie G. Peters, eds., *Behavioral Objectives: A Comprehensive Bibliography*, Instructional Technology Information Center, Division of Instructional Media, Office of Educational Resources, Northeastern University, Boston, Massachusetts 02115, 1971, 102 pp., \$3.

Ralph W. Tyler, *Basic Principles of Curriculum and Instruction*, University of Chicago Press, University of Chicago, 1949, 128 pp., \$2.

Norman P. Uhl, *Identifying Institutional Goals*, National Laboratory for Higher Education, Durham, North Carolina, 1971, 86 pp.

SUMMARY

As part of a major review article on the topic of objectives Ammons (1969) summarized the present state of affairs as follows:

"Examination of research regarding educational objectives and outcomes reveals several important factors. First, the terms themselves have no universally accepted definition, so discourse about objectives occurs on several levels of generality. Second, a statement of objectives or a recommended methodology for determining objectives is almost always couched in value terms, which renders empirical research in the classical sense difficult. Third, the question of what objectives ought to be sought has a history which dates at least from Plato. Fourth, pronouncements about objectives are more or less explicitly analyzed and justified opinions. Fifth, studies of a largely empirical nature in relation to objectives are few compared to the number of statements of objectives based upon individual or group opinion."

Review articles may serve an unanticipated service to the reader—they may relieve his anxiety. Upon completing a scholarly review the reader usually can say to himself something like this, "That's a relief. The experts seem unsure and in disagreement about this whole thing so I need not be concerned with it for a while." Ammons' summary is an accurate description of present state of affairs in this area. Yet it would be a shame if the momentum and forward thrust started by Mager's little book (if the anxiety which may be the motive force of the movement toward more explicit description of educational goals) were blunted or dissipated by total uncertainty. Of course, that there is great activity and argument in the area of behavioral objectives is not enough to prove that it is an important issue—there may be less there than meets the eye. Yet the accumulated wisdom and combined advice of experts ought not be brushed aside.

Surely there is a need to find ways to develop effective instruction efficiently and systematically. And there is an equal or greater need to develop instruments which accurately measure students' progress toward goals. Encouraging the teacher and instructional designer to state goals in behavioral terms may be a useful strategy in improving techniques of instruction and evaluation. To the extent the strategy works to produce those ends it is to be recommended.

Furthermore, any mechanism which causes fruitful and wider debate about the goals of education ought to be supported. The reduced ambiguity of behavioral statements is likely to lead to more meaningful discussion. Stake (1970) points to one area in which discussion will undoubtedly be most useful when ambiguity of goal statements is minimal:

"A list of objectives implies priorities; those expressed objectives have been considered to be more important than certain other objectives, a crude dichotomy. Priorities can be solicited that make finer gradation of importance. Priorities can indicate what kind and amount of emphasis will be given each objective. If there are unlimited resources or if all objectives are attainable in the time available it would not be so important to specify the priorities. In actuality, it is important not only to choose the objectives to be pursued but to allocate scarce resources to each of these several objectives . . . it is my belief that excessive attention has been given to precise goal-specification and insufficient attention to statements of priorities."

Clarification of objectives, then, can serve as the basis of many activities leading to the improvement of education. If this assumption is agreed to, some mechanism or technique for producing better goal statements is needed. The path proposed by proponents of behavioral objectives is a powerfully supported one and is one to explore fully.

A few relevant points may be made in conclusion:

(1) Attention is increasingly being focused on the particular function to be served by goal statements. As reported earlier, authors recently have stressed that different needs require statements of objectives that are linguistically somewhat different. A single grammatical frame, or format, does not seem appropriate to all occasions.

(2) The blind and ceaseless generation of behavioral objectives can begin to resemble ritualistic behavior, like Lady Macbeth's handwashing. It can deter the teacher or instructional designer from the important tasks (i.e., the uses to which the objectives are to be put). Statements of objectives are means. No matter how elegantly honed, they ought not to become ends in themselves.

(3) Some leading proponents of greater precision and quantification in instruction argue that, at least for some purposes, stating behavioral objectives may be diverting and emotionalizing. Thus Evans (1968) and Grobman (1968) both urge us to move quickly toward producing evaluation instruments. They would agree that the proof of the instructional pudding is in the posttest and it is to that instrument one ought to turn his attention.

(4) Writing behavioral objectives is obviously not an activity to be isolated from many others involved with instruction. The present review has been brief and narrowly delimited. It is almost incumbent upon the

interested reader to acquaint himself with such closely related topics as Task Analysis, Taxonomies, Educational Goal Setting, and the Interaction of Objectives and Conditions of Learning.

(5) The emphasis in this review has been primarily on practical matters but, as the section on Experimental Evidence of Benefits clearly demonstrated, much more research is called for to support and shape practices. Behavioral objectives allow research to occur; they provide unambiguous material for study. This is a benefit in itself.

(6) In this paper the emphasis has been on the use of behavioral objectives in planning, managing, and evaluating new instruction. Although it has not been stressed in the literature an alternative or concurrent use of objectives is in explicating the outcomes of present instruction. Recently a few large-scale projects (e.g., Project TALENT, The National Assessment Program) have been devoted to this inventorying of present educational outputs. Teachers, administrators, parents, and students ought to become interested and involved in this activity of measuring the present state of education. Specific "output" statements may be a necessary prerequisite to developing adequate measures. Ideally, unambiguous goal statements can be used in helping us to find out where we are as well as helping us to get where we want to be!

In the final analysis the movement to operationalize statements of educational goals (of which stating behavioral objectives is a part) is an important part of the growth of a new technology aimed at improving human performance. It is a first step in making more effective, systematic, and rational that most precious, most human activity—teaching others.

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